

The taxonomic and conservation status of *Milvus* kites in the Cape Verde archipelago: further (and final?) reflections

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SUMMARY.—Records of Red Kite *Milvus (milvus) fasciicauda* and Black Kite *M. migrans* on the Cape Verdes have been clouded by the difficulty of telling them apart (some earlier visitors not realising both species occurred). This convergence of identities may in part be due to hybridisation, although the two taxa appear to have been segregated to some extent by geography (*fasciicauda* on islands in the north-west and south-west, *migrans* on islands in the east). Recently, the form *fasciicauda*, regarded by some as a species, was judged not even to exist as a valid taxon; however, this conclusion was based in part on genetic analysis of birds attributable to *M. migrans*. Unfortunately, Red Kites have now almost or actually died out on the Cape Verdes, and Black Kites, showing somewhat different morphometrics from mainland birds and of intrinsic interest, are down to critically low numbers but still merit study.

The Cape Verde archipelago is the westernmost point in the global ranges of both the Red Kite *Milvus milvus* and Black Kite *M. migrans* (Hille & Thiollay 2000). Red Kite is known there by an endemic form, *M. milvus fasciicauda*, whereas the Black Kite of the islands is considered part of nominate *M. migrans migrans*. However, *fasciicauda* is morphologically less distinctive than nominate *milvus*, so that it is not so readily separated in the field from *migrans* (Hazevoet 1995, Hille & Thiollay 2000). Indeed, Bourne (1955) bluntly wrote of the Cape Verde Red Kite that it 'looks like the Black Kite', unaware of the latter's presence in the archipelago, so that some of his records of the former quite possibly referred to the latter. This problem of confused identities afflicts statements in the literature back to at least the 1860s and, despite the clarifications of Hazevoet (1995), still confounds our understanding of the former status and distribution of the two taxa in the archipelago. Moreover, the Abbé de Naurois (1984 and pers. comm.) plausibly suggested that hybridisation between Red and Black Kites had been occurring for some time, causing the former's decline towards extinction, and further exacerbating the problem of identification. A specimen from the southern island of Santiago has been considered a hybrid *fasciicauda* × *migrans*, and certain unattributable individuals observed on Santiago and Santo Antão in 1986–93 were also presumed to be hybrids (Hazevoet 1995), although actual proof by observation or molecular analysis is lacking (Hille & Thiollay 2000). An alternative explanation for the intermediacy of *fasciicauda*, favoured by Hazevoet (1995), is that it is or was a relic of the ancestor of Red and Black Kite before it divided into these two species (de Naurois 1987).

Conservation interest in *fasciicauda* was first promoted by Hazevoet (1995), who elevated it to species level under a phylogenetic species concept. Sangster (2000) then used the case of *fasciicauda* to develop Hazevoet's (1996) argument that the reliance of conservationists on the Biological Species Concept was resulting in the unopposed and indeed unrecognised extinction of taxa relegated to the status of subspecies. Independently, however, work by SMH on the kites of the Cape Verdes began in 1996 as an extension of her European *Milvus* studies (e.g. Hille 1995), and this led to further publicity for the plight of both taxa, whatever their taxonomic status (Hille & Thiollay 2000). This, in turn, generated

a Peregrine Fund (PF) project, implemented by SMH in October 2000–June 2002, to survey the entire archipelago for *fasciicauda* (which at the time PF, following Hazevoet 1995, considered a species), with a view to taking any individuals found into captivity for breeding (Watson 2001, 2002). The very brief accounts of this research in Watson (2001) and Anon. (2002) were, however, crucially mistaken in indicating that the six birds recorded in May–August 2001 on the eastern islands of Boavista (four) and Maio (two) belonged to *fasciicauda*, rather than just being six *Milvus* whose specific identity was uncertain (resembling Palearctic and African *migrans*, but with a somewhat different jizz: SMH & S. Thomsett pers. obs.).

Five birds were eventually captured in June 2002, all on Maio—not on Maio and Boavista as stated in Johnson *et al.* (2005), which is presumably the source of the statement in Clarke (2006) that *fasciicauda* was ‘also recorded recently on Boavista and Maio’. They were transferred to a breeding facility in the UK where they ‘were found to share characteristics of both Red Kites and Black Kites with substantial variation between individuals’, such that ‘molecular genetics will be needed to determine if and how these birds may be paired to breed and preserve the genes of Cape Verde Red Kites’ (Anon. 2001). In fact, this genetic analysis (Johnson *et al.* 2005) demonstrated that the five captive birds were all Black Kites. Prior to (and ignorant of plans to conduct) this genetic work, a parallel analysis of the same blood samples was undertaken in Germany involving not only mitochondrial cytochrome *b* but also nuclear DNA using Simple-Sequence Repeat profiles, and with this greater body of evidence it was also found that birds from Maio grouped together with Black Kites (SMH & M. Wink unpubl.). As a result, further plans by PF to conserve the kites of the Cape Verdes, including the breeding of the five captive individuals, were dropped (Johnson *et al.* 2005).

But were the birds captured on Maio in any way representative of the Cape Verde Red Kite, as Johnson *et al.* (2005) assumed? All the evidence, circumstantial and direct, points against this. The form *fasciicauda* was never known from Boavista or Maio: Hazevoet (1995) marshalled all the records, ancient and modern, and listed the taxon only for Santo Antão, São Vicente, São Nicolau, Santiago and Brava (with its satellite Rombo), adding that its general (though not absolute) preference for montane areas, as against the use of coastal and low-lying areas by *migrans*, suggests that in historical times it may never have occurred on the relatively flat Sal, Boavista and Maio. Moreover, six months’ research across the archipelago in 1996–97 produced sightings of *fasciicauda* on Santo Antão only and of *migrans* on Boavista only (Hille 1998, Hille & Thiollay 2000); and photographs taken in 2001 of birds on Boavista and in 2002 of captured birds on Maio confirm that, as judged at the time (see above), the birds were phenotypically akin to *migrans*.

Although DNA evidence from *fasciicauda* museum specimens suggests that this form sits polyphyletically within the Red Kite clade (Johnson *et al.* 2005), the bootstrap values involved were generally all low and it may be that, with more iterations and use of a second marker, *fasciicauda* would group monophyletically. This would have the likely effects of (a) reinstating the form as a valid taxon, and therefore (b) reopening debate about its specific or subspecific status and about the conservation of evolutionary significant units (ESUs), defined by a combination of reproductive and historical isolation (Moritz 1994) and adaptive distinctiveness (Lande & Shannon 1996, Lynch *et al.* 1999).

The same considerations apply to the seemingly undifferentiated Black Kites of the eastern islands. That these birds, according to Johnson *et al.* (2005), cluster with Palearctic Black Kites and not with the geographically far closer (Yellow-billed) Black Kites *Milvus migrans parasitus* (sometimes treated as a separate species; present in adjacent West Africa) suggests that they, like *fasciicauda*, possess intrinsic interest and value. Despite the absence

of genetic differentiation, the five birds from Maio provide at least a hint of evidence of adaptation to local insular conditions. SMH measured ten ecologically relevant variables—wing length, length of each toe (i.e. four values), tarso-metatarsal length, inter-tarsal joint width, Kipp's distance (wingtip to tip of secondary 1), bill length and body mass (see Leisler & Winkler 1985, 1991)—among 40 individual kites, namely ten *Milvus migrans migrans*, three *M. migrans parasitus*, 22 *M. milvus milvus* and the five birds from Maio, all living at the Wildtier- und Artenschutzstation, Sachsenhagen, Germany, and the National Birds of Prey Centre, Newent, UK. All birds measured were adult and the sexes were distributed evenly within groups except that the five birds from Maio consisted of four females and one male. Data were adjusted by dividing all characters by the cube root of the body mass, transformed to natural logarithms and analysed with canonical variates analysis (CVA: ter Braak 1995). The results (Fig. 1) reveal that, despite their genetic make-up, morphometrically Maio kites are more different from Black Kite than they are from Red, perhaps as an adaptation to their aerial snatching of large orthopterans from trees in the Cape Verdes (SMH pers. obs.).

Clearly, however, neither kite in the archipelago represents a powerful case for conservation attention from major broad-remit international bodies. Hazevoet's (1995) morphological diagnosis of *fasciicauda*, by which he elevated it to species level, involves a fairly tenuous set of characters that not only may be shown, to some degree, by certain individuals within nominate *milvus* (barred tails can, for example, be found relatively easily when examining images of continental Red Kites on the internet), but also may quite possi-

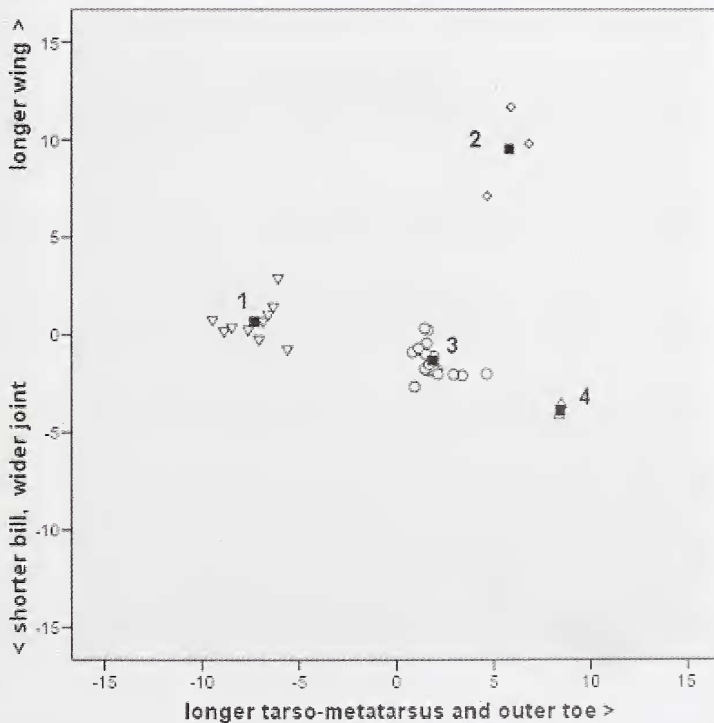


Figure 1. Plot of the scores resulting of a canonical variate analysis (CVA) with respect to (1) *Milvus migrans migrans*, (2) *M. migrans parasitus*, (3) *M. milvus milvus* and (4) Maio birds. Unit of scale is the standard deviation of the scores relative to the mean. We grouped individuals according to taxonomic origin. With CVA we obtained one highly significant factor (chi-square = 192.63, F.G. = 18, $p < 0.001$). It correlates mainly with five variables. Variables on the x-axis describe 70% and on the y-axis 28% of the variation.

bly have derived from a degree of introgression with *migrans*. Likewise, it is arguable that the variation in the Maio birds derives from a small degree of introgression, by recent ancestors moving between islands, with *M. milvus fasciicauda* (and thus these birds may possess genes from an otherwise probably extinct form) and / or a small degree of local adaptation to a prey-poor environment.

Even so, both taxa could still be considered strong regional or specialist priorities as nationally threatened species, ESUs and / or targets of groups interested in the conservation of raptor populations (things that BirdLife International, despite its cardinal focus on full species, has always readily promoted: see, e.g., Collar 1996). Unfortunately, however, the latest evidence from the Cape Verdes suggests that it is now too late, as birds answering the description of *fasciicauda* on the north-western and south-western islands can no longer be found. With the Black Kite population also dwindling—a roosting flock of 22 found on Maio on 18 July 2002 probably represented the great majority of birds remaining there and on adjacent Boavista (SMH pers. obs.)—we now face the loss of two enigmatic and interesting populations, and their associated functions and values, from the Cape Verde fauna. Of the five Maio birds captured in 2002, only two (a potential pair) remain alive, now at the Zoological Society of London (and still the property of the Cape Verde government); it is a matter of current discussion whether they should be encouraged to breed or returned to and freed on their island of origin (J. A. Ellis *in litt.* 2009). Certainly the Black Kites of the archipelago, though few in number, still offer important research opportunities (e.g. foraging adaptations and physiological and reproductive responses in a windswept food-poor environment), and academic engagement with their plight might yet help determine and promote appropriate remedial actions.

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